UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte CHARLES L. WOODS, JEHAD KHOURY
and JACK FU

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Appeal No. 1998-0818
Application No. 08/319,143

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ON BRIEF

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Before HAIRSTON, FLEMING, and LALL, **Administrative Patent Judges.**

FLEMING, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 3, 4, 6, 7 and 11 through 14. Claims 1, 2, 5, 8 through 10 were canceled.

The invention relates to recovering a distorted optical
image. On page 2 of the specification, Appellants identify
that the method of recovering the optical image involves
optically performing a pseudo deconvolution of the image. The
device to perform the optical pseudo deconvolution of the
image is shown in Appellants' figure 4, and described in the
specification on pages 8 through 11. On page 8 of the
specification, Appellants identify that the distorted or
blurred image is captured by a vidicon and the image is
inserted into a Spatial Light Modulator (SLM). On page 9 of
the specification, Appellants describe how a Fourier transform
image is created by illuminating the image on the SLM with a
laser. The image then passes through a lens,
item 30, to create a Fourier transform of the blurred image.
The Fourier transform image is acted on by two computer
generated optical filters, items 22 and 22', to create a
filtered image. One of the filters is a phase encoded filter
and the other is an amplitude encoded filter. On page 10 of
the specification, Appellants identify that the filtered image
is projected on an output plane through a second lens, item
36, which performs a Fourier transform on the filtered image.

On page 9 of the specification, Appellants describe the

amplitude encoded filter as having "a transmissivity which

increases along radial lines extending from a central portion

of the filter." On page 12 of the specification, Appellants

identify that the phase encoded filter can be either a binary

phase filter, a ternary filter or a amplitude encoded binary

phase filter. The coding of these three filter types is

described on page 15 of Appellants' specification.

     Independent claims 11 and 13 are representative of the

invention and read as follows:

> 11. A pseudo deconvolving method for
> recovering an optical image, which has been
> distorted by its convolution with a distortion
> function, by the convolution of the Fourier
> transformed distorted image with a filter
> approximating the reciprocal of the Fourier
> transformed distortion function comprising the
> steps of:
>   (a) producing a Fourier transform of a
> wavefront distorted optical image at a Fourier
> transform plan;
>   (b) approximating the exact phase portion
> of the reciprocal Fourier transform of the
> distortion function with a phase encoded filter
> having the form selected from the group
> consisting essentially of a binary phase coded
> filter, a ternary phase coded filter, and an
> amplitude coded filter having a shifted
> distortion function;

(c) providing said phase encoded filter at said Fourier transform plane;

(d) approximating the amplitude portion of the reciprocal Fourier transform of the distortion function with an amplitude encoded filter having a transmittance function which is statistically similar to the reciprocal spatial frequency spectrum of the Fourier transform of the distortion function;

(e) providing said amplitude encoded filter at said Fourier transform plane to produce an intermediate signal at the Fourier transform plane; and

(f) Fourier transforming said intermediate signal in order to recover the optical image having a substantially reduced degree of distortion.

13. A pseudo deconvolving apparatus for recovering an optical image, which has been distorted by its convolution with a distortion function, by the convolution of the Fourier transformed distorted image with a filter approximating the reciprocal of the Fourier transformed distortion function comprising:

(a) means for producing a Fourier transform of a wavefront distorted optical image at a Fourier transform plane;

(b) computer means for approximating the exact phase portion of the reciprocal Fourier transform of the distortion function with a non-continuous phase encoded filter and for providing said non-continous phase encoded filter at said Fourier transform plane;

(c) computer means for approximating the amplitude portion of the reciprocal Fourier transform of the distortion function with an amplitude encoded filter having a transmittance function which is statistically similar to the reciprocal spatial frequency spectrum of the Fourier transform of the distortion function and

for providing said amplitude encoded filter at
said Fourier transform plane to produce an
intermediate signal at the Fourier transform
plane; and
    (d) means for Fourier transforming said
intermediate signal in order to recover the
optical image having a substantially reduced
degree of distortion.

The Examiner relies upon the following reference:

Chen et al. (Chen)   5,426,521   Jun. 20,
1995
                                    (filed Dec. 22, 1992)

Claim 13 stands rejected under 35 U.S.C. § 102 as being

anticipated by Chen et al.

Claims 3, 4, 6, 7, 11, 12 and 14 stand rejected under

35 U.S.C. § 103 as being unpatentable over Chen et al.

Rather then reiterate the arguments of the Appellants and

the Examiner, reference is made to the Briefs[1] and Answers[2] for

the respective details thereof.

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[1] Appellants filed an Appeal Brief on September 8, 1997.
On December 22, 1997 Appellants filed a Reply Brief. On
January 13, 1998, the Examiner mailed a communication stating
that the reply brief had been considered and entered.

[2] The Examiner mailed an Examiner's Answer on November 25,
1997. On April 14, 2000 the Examiner mailed a Supplemental
Examiner's Answer in response to a Remand from the Board of
Appeals and Interferences.

Opinion

After careful review of the evidence before us, we agree with the Examiner's rejection of claim 13 under 35 U.S.C. § 102. However, we disagree with the Examiner's rejection of claims 3, 4, 6, 7, 11, 12 and 14 under 35 U.S.C. § 103.

We first consider the rejection of claim 13 under 35 U.S.C. § 102. Anticipation is established only when a single prior art reference discloses, expressly or under the principles of inherency, each and every element of a claimed invention as well as disclosing structure which is capable of performing the recited functional limitations. *RCA Corp. v. Applied Digital Data Sys. Inc*., 730 F2d 1440, 1444, 221 USPQ 385,388 (Fed. Cir. 1984), *cert. dismissed*, 468 U.S. 1228 (1984); *W. L. Gore & Assocs., Inc. v. Garlock Inc*., 721 F.2d 1540, 1554, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). A reference anticipates a claim if it discloses the claimed invention "such that a skilled artisan could take it's teachings in combination with his own knowledge of the particular art and be in possession of the invention." *In re Graves* 69 F.3d 1147, 1152, 36 USPQ2d 1697,

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1701 (Fed. Cir. 1995) (*citing In re LeGrice* 301 F.2d 292, 293,

133 USPQ 365,372 (CCPA 1962)).

Appellants argue on page 5 of the Brief that the encoded

filter used in paragraph, (b) of claim 13 in combination with

the amplitude encoded filter of paragraph, (c) of claim 13 is

not suggested by the references. Further, Appellants argue

that Chen teaches away from using "an inexpensive SLM

incapable of exact phase compensation," stating that Chen

"seeks to approach exact phase compensation employing

iteration." On pages 1 and 2 of the Brief, Appellants assert

that the claim 13 limitation of a "non-continuous phase

encoded filter" precludes Chen's filter which is iteratively

adjusted.

On page 4 of the Answer, the Examiner asserts that Chen

teaches an image recovery apparatus which uses a phase encoded

filter and an amplitude encoded filter. On page 6 of the

Answer, the Examiner asserts that Chen teaches "the phase

encoded filter of claim 13 with the specificity recited in

paragraph (b)."

As pointed out by our reviewing court, we must first

determine the scope of the claim. "[T]he name of the game is

the claim." *In re Hiniker Co*., 150 F.3d 1362, 1369, 47 USPQ2d

1523, 1529 (Fed. Cir. 1998). Claims will be given their

broadest reasonable interpretation consistent with the

specification, and limitations appearing in the specification

are not to be read into the claims. *In re Etter*, 756 F.2d

852, 858, 225 USPQ 1,

5 (Fed. Cir. 1985).

    We find that the scope of claim 13 includes a non-

continuous phase encoded filter and an amplitude encoded

filter having a transmittance function which is statistically

similar to the reciprocal spatial frequency spectrum of the

Fourier transform of the distortion function. This scope is

shown in the following limitations of claim 13: "(b) computer

means for . . . providing said non-continuous phase encoded

filter at said Fourier transform plane" and "(c) computer

means for approximating the amplitude portion of the

reciprocal Fourier transform of the distortion function with

an amplitude encoded filter having a transmittance function

which is statistically similar to the reciprocal spatial

frequency spectrum of the Fourier transform of the distortion

function . . ." The term "non-continuous phase encoded

filter" is not defined in the Appellants' specification.

However, on page 15 of the specification, the coding of the

three phase encoded filters is described. These filters code

frequency in the range of $-\mathbf{B}$ to $\mathbf{B}$ into either one of two

values, or one of three values (e.g., the frequency is encoded

into either a two or three-value discrete scale). Thus, we

find that the term "non-continuous phase encoded filter",

means a filter which has discrete phase encoding, i.e., the

filter does not have phase encoding across a continuous

spectrum.

We consider Appellants' assertions on page 5 of the Brief

that "Chen teaches away from Appellants' pseudo deconvolution

method of employing an inexpensive SLM incapable of exact

phase compensation and a simple encoded amplitude filter" to

be unsupported by the claims. Appellants have not provided

any showing of claim language which differentiates Appellants'

method of using "inexpensive SLM incapable of exact

compensation" from Chen. Further, we find that claim 13

contains no limitations related to an SLM or the abilities of

it's phase compensation.

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We find that Chen teaches a system to remove aberrations from an image. See column 8, lines 19 through 21. We find that Chen teaches using both a "non-continuous phase encoded filter" and an amplitude encoded filter which is statistically similar to the reciprocal spatial frequency spectrum of Fourier transform of the distortion function. Chen teaches that the phase filter is controlled by the computer and that the control data output from the computer is digital. See column 5, lines 33 through 40. Accordingly, we find that the values which can be taken on by the phase filter are discrete and non-continuous. Chen teaches that the amplitude filter is in the Fourier transform plane. See column 3, lines 62 through 63. Further, Chen teaches that the amplitude encoded filter is controlled to have an amplitude corresponding to the reciprocal of the optical transfer function of the system which created the image distortion. See column 8, lines 50 through 57. Thus, we find that Chen teaches that the amplitude encoded filter is statistically similar to the reciprocal spatial frequency spectrum of Fourier transform of the distortion function.

We note that with respect to the rejection of claim 13 as being anticipated by Chen, Appellants have chosen not to argue any other specific limitations of claim 13 as a basis for patentability. We are not required to raise and/or consider such issues. As stated by our reviewing court in **_In re Baxter Travenol Labs._**, 952 F.2d 388, 391, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991), "[i]t is not the function of this court to examine the claims in greater detail than argued by an appellant, looking for nonobvious distinctions over the prior art."

37 CFR § 1.192(a) as **amended at** 60 Fed. Reg. § 14518 (March

17, 1995), which was controlling at the time of Appellants'

filing the Brief, states as follows:

> The Brief . . . must set forth the authorities and
> arguments on which the appellant will rely to
> maintain the appeal. Any arguments or authorities
> not included in the brief may be refused
> consideration by the Board of Patent Appeals and
> Interferences.

Also, 37 CFR § 1.192(c)(8)(iii) states:

> For each rejection under 35 U.S.C. § 102, the
> argument shall specify the errors in the rejection
> and why the rejected claims are patentable under 35
> U.S.C. § 102, including any specific limitations in
> the rejected claims which are not described in the
> prior art relied upon in the rejection.

Thus, 37 CFR § 1.192 provides that just as the court is not

under any burden to raise and/or consider such issues, this

board is also not under any greater burden. For the foregoing

reasons, we sustain the Examiner's rejection of claim 13 under

35 U.S.C.

§ 102.

We next consider the rejection of claims 3, 4, 6, 7, 11,

12 and 14 under 35 U.S.C. § 103. It is the burden of the

Examiner to establish why one having ordinary skill in the art

would have been led to the claimed invention by the express

teachings or suggestions found in the prior art or by the

implications contained in such teachings or suggestions. ***In***

re Sernaker,

702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983).

"Additionally, when determining obviousness, the claimed

invention should be considered as a whole; there is no legally

recognizable 'heart' of the invention." ***Para-Ordnance Mfg. V***

SGS Importers Int'l Inc., 73 F3d 1085, 1087, 37 USPQ2d 1237,

1239 (Fed. Cir. 1995) (***citing W. L. Gore & Assocs., Inc.v.***

Garlock Inc., 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed.

Cir. 1983), ***Cert. denied***, 469 U.S. 851 (1984)).

Appellants' arguments on pages 4 and 5 of the Brief

addressed above were also applied to the rejection of

independent claims 11, 12 and 14 based upon 35 U.S.C. § 103.

Further, Appellants argue on page 5 of the Brief that the

Examiner used improper hindsight by taking the Official Notice

of using various known filters in combination with Chen.

Appellants assert on page 6 of the Brief that Chen provides no

suggestion to use the specific filters of paragraphs (b) and
(d) of the claims.

On page 5 of the Answer, the Examiner takes the Official
Notice, "that synthesis of a complex-valued inverse filter by
the tandem arrangement of an amplitude-encoded transparency
with a binary-phase encoded transparency has been known for
decades. Notably, restriction of the phase levels to values
of 0 and **B** radians causes the complex filter variables to be
real-valued everywhere during the computation." Further, with
respect to claim 14, the Examiner states "the selection of any
particular transmissivity would have been a rather obvious
matter of adapting the amplitude-encoded mask to the
distortion of the particular optical channel in use."

We find that the scope of claims 11 and 12 includes that
the phase encoded filter is only one of a binary coded filter,
ternary phase coded filter, and an amplitude coded filter
having a shifted distortion function. This scope is shown in
the following language common to claims 11 and 13, paragraph
(b): "a phase encoded filter having the form selected from the
group consisting essentially of a binary coded filter, a
ternary phase coded filter, and an amplitude coded filter

having a shifted distortion function." We find that the

coding of these three filter types is defined on page 15 of

Appellants' specification. Thus, we find that the scope of

claims 11 and 12 includes that the phase encoded filter is

only one of the three types of encoded filters defined on page

15 of the Appellants' specification.

We find that the scope of independent claim 14 and

dependent claim 6 includes that the amplitude encoded filter

has a transmissivity which increases along radial lines. This

scope is shown in the following language common to claim 13

and claim 6: "wherein said amplitude encoded filter has a

transmissivity which increases along radial lines extending

from a central portion of said amplitude encoded filter."

We note that the Examiner's use of the Official Notice

and statements of what is obvious on page 5 of the Brief are

unsupported by evidence on the record. Upon challenge of the

assertions by the Appellants, the Examiner should have

supplemented the stated rejection with a reference providing

evidence of noticed assertions. We are not inclined to

dispense with proof by evidence when the proposition at issue

is not supported by a teaching in a prior art reference or

shown to be common knowledge of unquestionable demonstration.

Our reviewing court requires this evidence in order to

establish a **prima facie** case. **In re Piasecki,** 745 F.2d 1468,

1471-72, 223 USPQ 785,

787-88 (Fed. Cir. 1984); **In re Knapp-Monarch Co.**, 296 F.2d

230, 232, 132 USPQ 6, 8 (CCPA 1961); **In re Cofer**, 354 F.2d

664, 668, 148 USPQ 268, 271-72 (CCPA 1966). Furthermore, our

reviewing court states in **In re Piasecki**, 745 F.2d 1468, 1472,

223 USPQ 785, 788 (Fed. Cir. 1984) the following:

> The Supreme Court in **Graham v. John Deere Co.**, 383
> U.S. 1 (1966), focused on the procedural and
> evidentiary processes in reaching a conclusion under
> Section 103. As adapted to ex parte procedure,
> Graham is interpreted as continuing to place the
> "burden of proof on the Patent Office which requires
> it to produce the factual basis for its rejection of
> an application under section 102 and 103". **Citing
> In re Warner**, 379 F.2d 1011, 1020, 154 USPQ 173, 177
> (CCPA 1967).

Nonetheless, we find that Chen fails to teach or suggest

using any one of the specifically defined coded phase filters

defined on page 15 of the specification or that the amplitude

filter has a transmissivity which increases along radial lines

from a central portion. As stated above, we find that Chen

teaches a system to remove aberrations from an image which

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uses an amplitude encoded 3 filter and a phase encoded filter in a Fourier transform plane. We find that Chen teaches that the phase encoded filter is iteratively adjusted. See column 9, lines 5 to 15. We find that iterative adjustment of the phase encoded filter does not meet the definition of either a binary phase coded filter, a ternary coded filter or an amplitude coded filter. Further, we find that Chen teaches that the filters are adjusted on a pixel-by-pixel basis. Column 5, lines 40 through 46. Thus, we find that Chen does not teach that the amplitude encoded filter has a transmissivity which increases along radial lines extending from a central portion of said amplitude. Accordingly, we will not sustain the rejection of claims 3, 4, 6, 7, 11, 12 and 14 under 35 U.S.C. § 103.

For the foregoing reasons we affirm the rejection of claim 13 under 35 U.S.C. § 102 and we reverse the rejection of claims 3, 4, 6, 7, 11, 12 and 14 under 35 U.S.C. § 103.

AFFIRMED-IN-PART

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KENNETH W. HAIRSTON              )
Administrative Patent Judge      )
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                                 ) BOARD OF PATENT
MICHAEL R. FLEMING               )     APPEALS
Administrative Patent Judge      )       AND
                                 )   INTERFERENCES
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PARSHOTAM S. LALL                )
Administrative Patent Judge      )
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MRF/sld

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Application No. 08/319,143

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Appeal No. 1998-0818
Application No. 08/319,143

APJ FLEMING

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APJ KIMLIN

<u>REVERSED</u>

Prepared: June 25, 2001